

FIG. 1

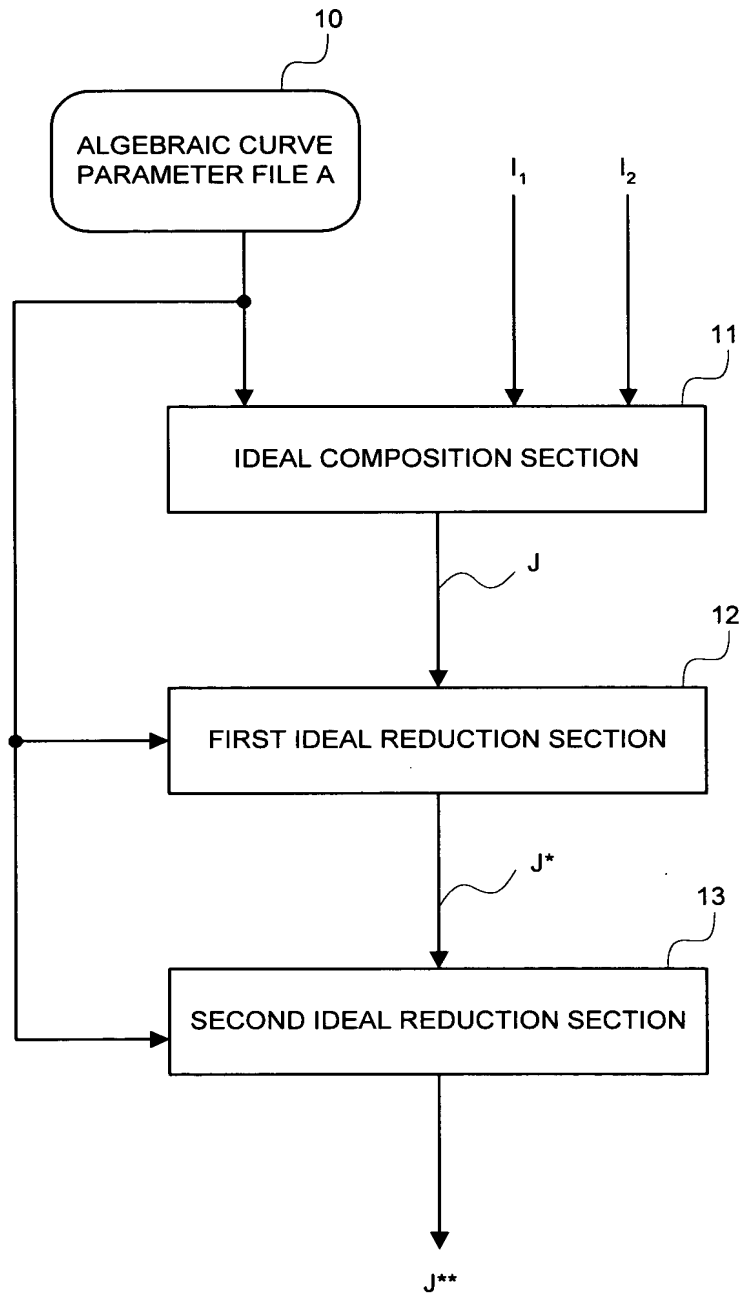
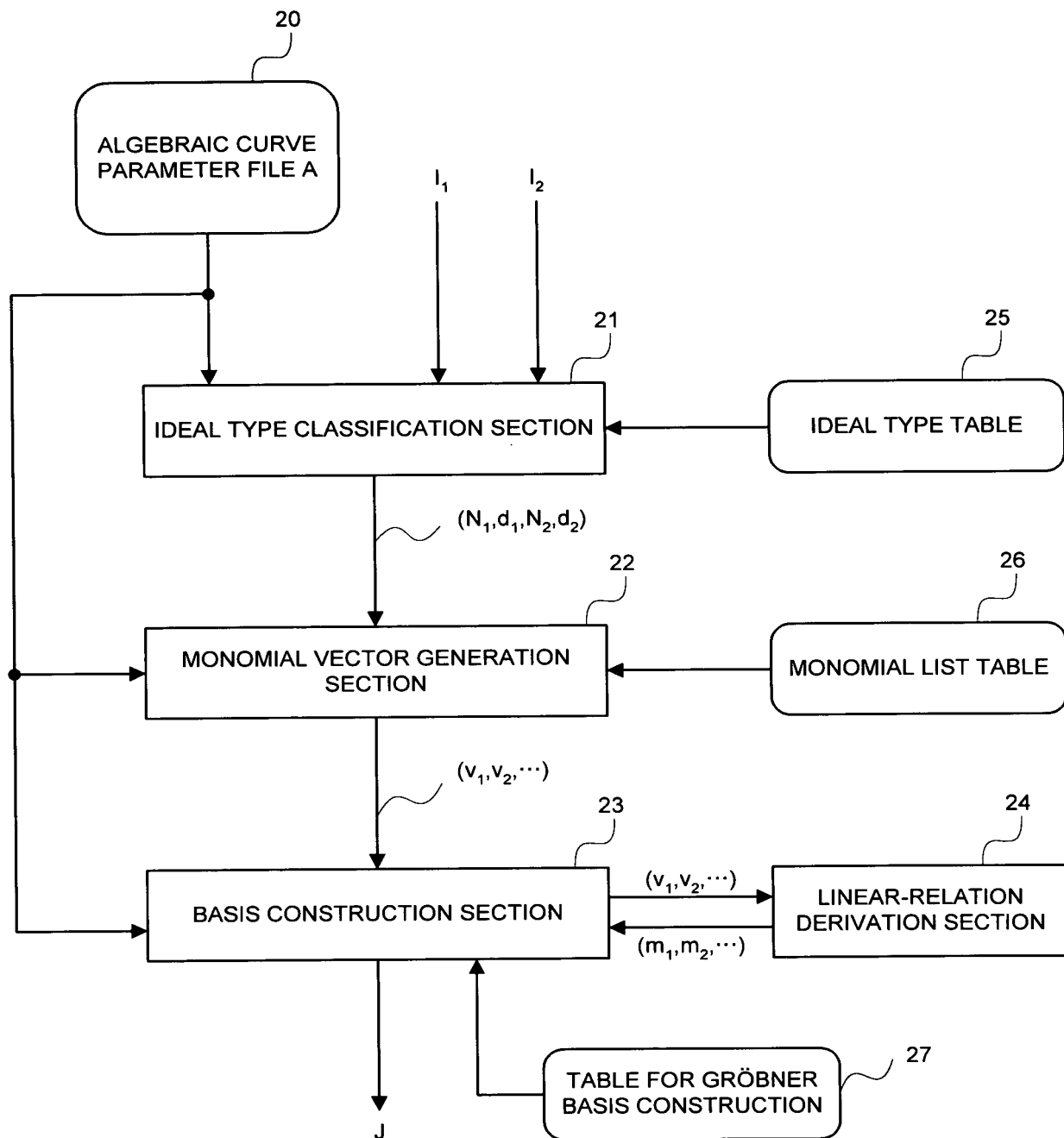


FIG. 2



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FIG. 3

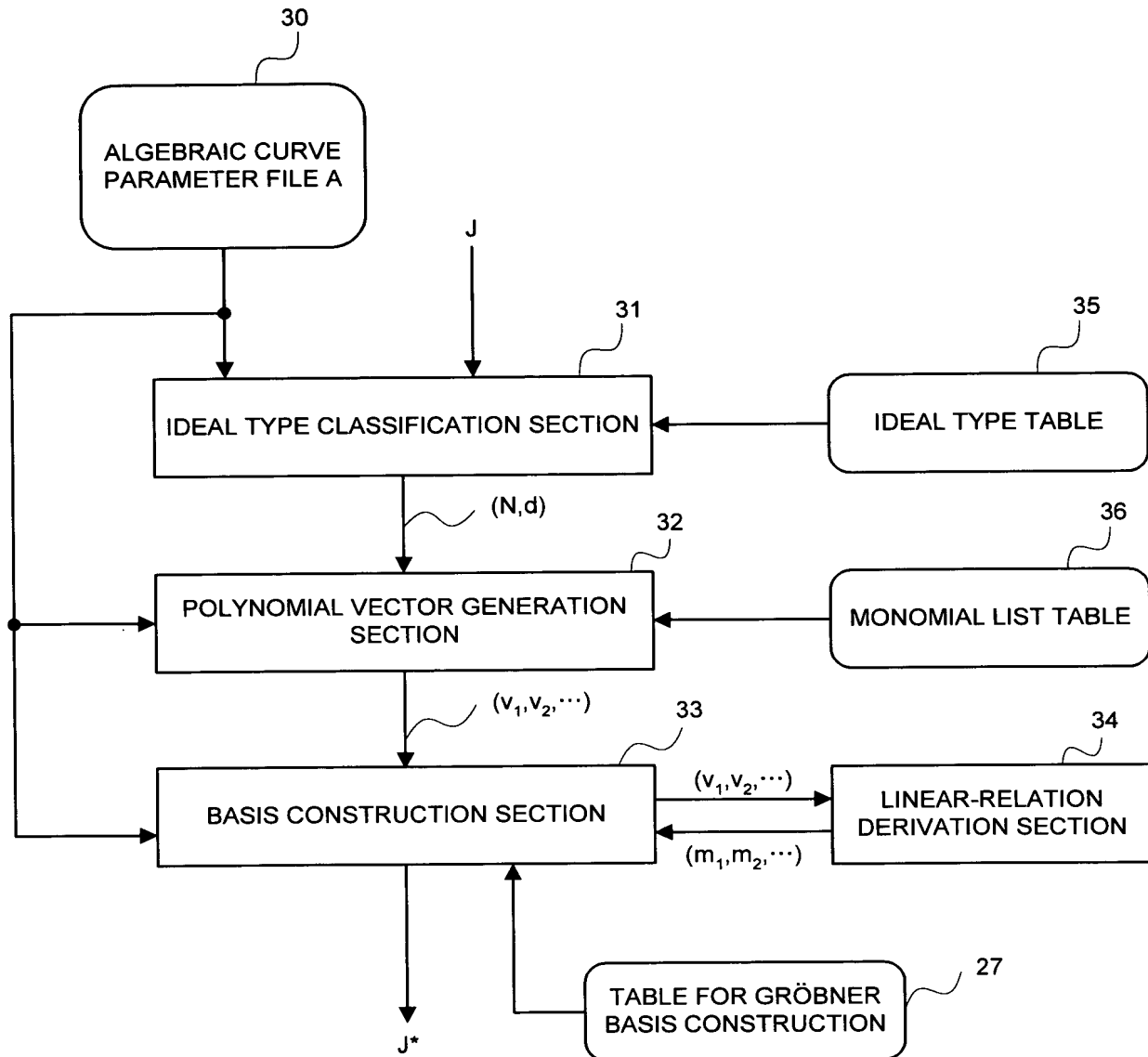


FIG. 4

ORDER OF FIELD OF DEFINITION	1009
MONOMIAL ORDER	1, X, Y, X <sup>2</sup> , XY, Y <sup>2</sup> , X <sup>3</sup> , X <sup>2</sup> Y, XY <sup>2</sup> , X <sup>4</sup> , Y <sup>3</sup>
COEFFICIENT LIST	0,7,0,0,0,0,0,0,0,1,1

FIG. 5

RECORD NUMBER	IDEAL TYPE NUMBER	IDEAL TYPE	ORDER	REDUCTION ORDER
1	61	$\{X^3+a_6Y^2+a_5XY+a_4X^2+a_3Y+a_2X+a_1, X^2Y+b_6Y^2+b_5XY+b_4X^2+b_3Y+b_2X+b_1, XY^2+c_6Y^2+c_5XY+c_4X^2+c_3Y+c_2X+c_1\}$	6	3
2	62	$\{Y^2+a_5XY+a_4X^2+a_3Y+a_2X+a_1, X^3+b_5XY+b_4X^2+b_3Y+b_2X+b_1\}$	6	2
3	63	$\{Y^2+a_5XY+a_4X^2+a_3Y+a_2X+a_1, X^2Y+b_6X^3+b_5XY+b_4X^2+b_3Y+b_2X+b_1\}$	6	2
4	64	$\{XY+a_4X^2+a_3Y+a_2X+a_1, X^4+b_6X^3+b_5Y^2+b_4X^2+b_3Y+b_2X+b_1\}$	6	1
5	65	$\{X^2+a_3Y+a_2X+a_1\}$	6	0
6	51	$\{Y^2+a_5XY+a_4X^2+a_3Y+a_2X+a_1, X^3+b_5XY+b_4X^2+b_3Y+b_2X+b_1, X^2Y+c_5XY+c_4X^2+c_3Y+c_2X+c_1\}$	5	3
7	52	$\{XY+a_4X^2+a_3Y+a_2X+a_1, Y^2+b_4X^2+b_3Y+b_2X+b_1\}$	5	2
8	53	$\{XY+a_4X^2+a_3Y+a_2X+a_1, X^3+b_5Y^2+b_4X^2+b_3Y+b_2X+b_1\}$	5	2
9	54	$\{X^2+a_3Y+a_2X+a_1, XY^2+b_5Y^2+b_4XY+b_3Y+b_2X+b_1\}$	5	1
10	41	$\{XY+a_4X^2+a_3Y+a_2X+a_1, Y^2+b_4X^2+b_3Y+b_2X+b_1, X^3+c_4X^2+c_3Y+c_2X+c_1\}$	4	3
11	42	$\{X^2+a_3Y+a_2X+a_1, XY+b_3Y+b_2X+b_1\}$	4	2
12	43	$\{X^2+a_3Y+a_2X+a_1, Y^2+b_4XY+b_3Y+b_2X+b_1\}$	4	2
13	44	$\{Y+a_2X+a_1\}$	4	0
14	31	$\{X^2+a_3Y+a_2X+a_1, XY+b_3Y+b_2X+b_1, Y^2+c_3Y+c_2X+c_1\}$	3	3
15	32	$\{Y+a_2X+a_1, X^3+b_3X^2+b_2X+b_1\}$	3	1
16	33	$\{X+a_1\}$	3	0
17	21	$\{Y+a_2X+a_1, X^2+b_2X+b_1\}$	2	2
18	22	$\{Y+a_1, Y^2+b_2Y+b_1\}$	2	1
19	11	$\{X+a_1, Y+b_1\}$	1	2

FIG. 6

RECORD NUMBER	ORDER	MONOMIAL LIST
1	6	1, X, Y, X <sup>2</sup> , XY, Y <sup>2</sup> , X <sup>3</sup> , X <sup>2</sup> Y, XY <sup>2</sup> , X <sup>4</sup>
2	5	1, X, Y, X <sup>2</sup> , XY, Y <sup>2</sup> , X <sup>3</sup> , X <sup>2</sup> Y, XY <sup>2</sup>
3	4	1, X, Y, X <sup>2</sup> , XY, Y <sup>2</sup> , X <sup>3</sup>
4	3	1, X, Y, X <sup>2</sup> , XY, Y <sup>2</sup> , X <sup>3</sup>
5	2	1, X, Y, X <sup>2</sup> , XY, Y <sup>2</sup>
6	1	1, X, Y

FIG. 7

RECORD NUMBER	ORDER	COMPONENT NUMBER LIST	FIRST VECTOR TYPE	SECOND VECTOR TYPE	THIRD VECTOR TYPE
1	6	7,8,9,10	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,1,0,0)	(*,*,*,*,*,0,0,1,0)
2	6	6,7,9,10	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,1,0,0,0)	null
3	6	6,8,9,10	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,*,1,0,0)	null
4	6	5,8,9,10	(*,*,*,*,*,1,0,0,0,0,0)	(*,*,*,*,*,0,*,*,0,0,1)	null
5	6	4,7,8,10	(*,*,*,*,*,1,0,0,0,0,0,0)	null	null
6	5	6,7,8,9	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,1,0,0)	(*,*,*,*,*,0,0,1,0)
7	5	5,6,8,9	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,1,0,0,0)	null
8	5	5,7,8,9	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,*,1,0,0)	null
9	5	4,7,8,9	(*,*,*,*,*,1,0,0,0,0,0)	(*,*,*,*,*,0,*,*,0,0,1)	null
10	4	5,6,7	(*,*,*,*,*,1,0,0)	(*,*,*,*,*,0,1,0)	(*,*,*,*,*,0,0,1)
11	4	4,5,7	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,1,0,0)	null
12	4	4,6,7	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,*,1,0)	null
13	4	3,5,6	(*,*,*,*,*,1,0,0,0,0)	null	null
14	3	4,5,6,7	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,1,0,0)	(*,*,*,*,*,0,0,1,0)
15	3	3,5,6,7	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,*,*,0,0,1)	null
16	3	2,4,5,7	(*,*,*,*,*,1,0,0,0,0,0)	null	null
17	2	3,4,5,6	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,1,0,0)	null
18	2	2,4,5,6	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,*,*,0,0,1)	null
19	1	2,3	(*,*,*,*,*,1,0)	(*,*,*,*,*,0,1)	null

FIG. 8

ORDER OF FIELD OF DEFINITION	1009
MONOMIAL ORDER	1, X, X <sup>2</sup> , X <sup>3</sup> , Y, X <sup>4</sup> , XY, X <sup>5</sup> , X <sup>2</sup> Y, X <sup>6</sup> , X <sup>3</sup> Y, X <sup>7</sup> , Y <sup>2</sup>
COEFFICIENT LIST	0,7,0,0,0,0,0,0,0,0,1,1

FIG. 9

RECORD NUMBER	IDEAL TYPE NUMBER	IDEAL TYPE	ORDER	REDUCTION ORDER
1	61	$\{XY+a_6X^4+a_5Y+a_4X^3+a_3X^2+a_2X+a_1, X^5+b_6X^4+b_5Y+b_4X^3+b_3X^2+b_2X+b_1\}$	6	3
2	62	$\{X^4+a_5Y+a_4X^3+a_3X^2+a_2X+a_1, X^2Y+b_6XY+b_5Y+b_4X^3+b_3X^2+b_2X+b_1\}$	6	2
3	63	$\{Y+a_4X^3+a_3X^2+a_2X+a_1, X^6+b_6X^5+b_5X^4+b_4X^3+b_3X^2+b_2X+b_1\}$	6	1
4	64	$\{X^3+a_3X^2+a_2X+a_1\}$	6	0
5	51	$\{X^4+a_5Y+a_4X^3+a_3X^2+a_2X+a_1, XY+b_5Y+b_4X^3+b_3X^2+b_2X+b_1\}$	5	3
6	52	$\{Y+a_4X^3+a_3X^2+a_2X+a_1, X^5+b_5X^4+b_4X^3+b_3X^2+b_2X+b_1\}$	5	2
7	53	$\{X^3+a_3X^2+a_2X+a_1, X^2Y+b_5XY+b_4Y+b_3X^2+b_2X+b_1\}$	5	1
8	41	$\{Y+a_4X^3+a_3X^2+a_2X+a_1, X^4+b_4X^3+b_3X^2+b_2X+b_1\}$	4	3
9	42	$\{X^3+a_3X^2+a_2X+a_1, XY+b_4Y+b_3X^2+b_2X+b_1\}$	4	2
10	43	$\{X^2+a_2X+a_1\}$	4	0
11	31	$\{X^3+a_3X^2+a_2X+a_1, Y+b_3X^2+b_2X+b_1\}$	3	3
12	32	$\{X^2+a_2X+a_1, XY+b_3Y+b_2X+b_1\}$	3	1
13	21	$\{X^2+a_2X+a_1, Y+b_2X+b_1\}$	2	2
14	22	$\{X+a_1\}$	2	0
15	11	$\{X+a_1, Y+b_1\}$	1	1

FIG.10

RECORD NUMBER	ORDER	MONOMIAL LIST
1	6	1, X, X <sup>2</sup> , X <sup>3</sup> , Y, X <sup>4</sup> , XY, X <sup>5</sup> , X <sup>2</sup> Y, X <sup>6</sup>
2	5	1, X, X <sup>2</sup> , X <sup>3</sup> , Y, X <sup>4</sup> , XY, X <sup>5</sup> , X <sup>2</sup> Y
3	4	1, X, X <sup>2</sup> , X <sup>3</sup> , Y, X <sup>4</sup> , XY
4	3	1, X, X <sup>2</sup> , X <sup>3</sup> , Y, X <sup>4</sup> , XY
5	2	1, X, X <sup>2</sup> , X <sup>3</sup> , Y
6	1	1, X, X <sup>2</sup> , X <sup>3</sup> , Y

FIG. 11

RECORD NUMBER	ORDER	COMPONENT NUMBER LIST	FIRST VECTOR TYPE	SECOND VECTOR TYPE	THIRD VECTOR TYPE
1	6	7,8,9,10	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,1,0,0)	null
2	6	6,8,9,10	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,*,0,1,0)	null
3	6	5,7,9,10	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,*,0,*,0,1)	null
4	6	4,6,8,10	(*,*,*,*,*,1,0,0,0,0,0)	null	null
5	5	6,7,8,9	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,1,0,0)	null
6	5	5,7,8,9	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,*,0,1,0)	null
7	5	4,6,8,9	(*,*,*,*,*,1,0,0,0,0,0)	(*,*,*,*,*,0,*,0,*,0,1)	null
8	4	5,6,7	(*,*,*,*,*,1,0,0)	(*,*,*,*,*,0,1,0)	null
9	4	4,6,7	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,*,1,0)	null
10	4	3,4,6	(*,*,*,*,*,1,0,0,0,0)	null	null
11	3	4,5,6,7	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,1,0,0)	null
12	3	3,4,6,7	(*,*,*,*,*,1,0,0,0,0)	(*,*,*,*,*,0,*,0,1)	null
13	2	3,4,5	(*,*,*,*,*,1,0,0)	(*,*,*,*,*,0,0,1)	null
14	2	2,3,4	(*,*,*,*,*,1,0,0,0)	null	null
15	1	2,3,4,5	(*,*,*,*,*,1,0,0,0)	(*,*,*,*,*,0,0,0,1)	null

FIG. 12

ORDER OF FIELD OF DEFINITION	1009
MONOMIAL ORDER	1, X, X <sup>2</sup> , Y, X <sup>3</sup> , XY, X <sup>4</sup> , X <sup>2</sup> Y, X <sup>5</sup> , Y <sup>2</sup>
COEFFICIENT LIST	0,7,0,0,0,0,0,0,1,1

FIG. 13

RECORD NUMBER	IDEAL TYPE NUMBER	IDEAL TYPE	ORDER	REDUCTION ORDER
1	41	{X <sup>3</sup> +a <sub>4</sub> Y+a <sub>3</sub> X <sup>2</sup> +a <sub>2</sub> X+a <sub>1</sub> , XY+b <sub>4</sub> Y+b <sub>3</sub> X <sup>2</sup> +b <sub>2</sub> X+b <sub>1</sub> }	4	2
2	42	{Y+a <sub>3</sub> X <sup>2</sup> +a <sub>2</sub> X+a <sub>1</sub> , X <sup>4</sup> +b <sub>4</sub> X <sup>3</sup> +b <sub>3</sub> X <sup>2</sup> +b <sub>2</sub> X+b <sub>1</sub> }	4	1
3	43	{X <sup>2</sup> +a <sub>2</sub> X+a <sub>1</sub> }	4	0
4	31	{Y+a <sub>3</sub> X <sup>2</sup> +a <sub>2</sub> X+a <sub>1</sub> , X <sup>3</sup> +b <sub>3</sub> X <sup>2</sup> +b <sub>2</sub> X+b <sub>1</sub> }	3	2
5	32	{X <sup>2</sup> +a <sub>2</sub> X+a <sub>1</sub> , XY+b <sub>3</sub> Y+b <sub>2</sub> X+b <sub>1</sub> }	3	1
6	21	{X <sup>2</sup> +a <sub>2</sub> X+a <sub>1</sub> , Y+b <sub>2</sub> X+b <sub>1</sub> }	2	2
7	22	{X+a <sub>1</sub> }	2	0
8	11	{X+a <sub>1</sub> , Y+b <sub>1</sub> }	1	1

FIG. 14

RECORD NUMBER	ORDER	MONOMIAL LIST
1	4	1, X, X <sup>2</sup> , Y, X <sup>3</sup> , XY, X <sup>4</sup>
2	3	1, X, X <sup>2</sup> , Y, X <sup>3</sup> , XY
3	2	1, X, X <sup>2</sup> , Y
4	1	1, X, X <sup>2</sup> , Y

FIG. 15

RECORD NUMBER	ORDER	COMPONENT NUMBER LIST	FIRST VECTOR TYPE	SECOND VECTOR TYPE	THIRD VECTOR TYPE
1	4	5,6,7	(*,*,*,1,0,0)	(*,*,*,0,1,0)	null
2	4	4,6,7	(*,*,*,1,0,0,0)	(*,*,*,0,*,0,1)	null
3	4	3,5,7	(*,*,1,0,0,0,0)	null	null
4	3	4,5,6	(*,*,*,1,0,0)	(*,*,*,0,1,0)	null
5	3	3,5,6	(*,*,1,0,0,0)	(*,*,*,0,*,0,1)	null
6	2	3,4	(*,*,1,0)	(*,*,*,0,1)	null
7	2	2,3	(*,1,0,0)	null	null
8	1	2,3,4	(*,1,0,0)	(*,0,0,1)	null

FIG. 16

	ADDITION	ARITHMETIC OF TWO-TIMES MULTIPLE
COMPOSITION OPERATION	134M+3I	214M+3I
CONTRACTION OPERATION FOR IDEAL OF TYPE 61	54M+I	54M+I
CONTRACTION OPERATION FOR IDEAL OF TYPE 31	16M+I	16M+I
TOTAL	204M+5I	284M+5I